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CROSS REFERENCE RELATED APPLICATIONS

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Reference is made to Document Disclosure No. 487063 submitted January 12, 2001 entitled "Dustless Precision Electric Miter Box (DPEMB)".

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As shown in FIGS. 3-5, a work-holding member 26 has a channel shape with a base 28 and two opposite side walls 30 extending longitudinally on the base 28 between the first end 32 and the second end 34 of the work-holding member 26. The ends 32, 34 are open, having no walls formed thereon. In this manner a workpiece W may be disposed within the work-holding member 26 between the side walls 30 with the workpiece extending from the first end 32 or from both the first end 32 and the second end 34 as there is no restriction on the length of the workpiece W. The work-holding member 26 further has at least two protrusions 36 extending downwardly from the bottom surface of the base 28. The protrusions 36 may be a peg or pin. One protrusion 36, disposed proximal to the second end 34 of the work-holding member 26, is received in the second curved track 24 on the top surface 14 of the housing 12. At least one, and preferably two, protrusions 36 are disposed proximal to the first end 32 of the work-holding member 26. If there are two protrusions 36', 36", the protrusions are spaced apart. The protrusions 36', 36" are received in the first curved track 22. If there are two protrusions, one protrusion 36' is received in one of the inverted "L" portions and the other protrusion 36" is received in the other of the inverted "L" portions. In this manner, the work-holding member 26 is connected to the top surface 14 of the housing 12.

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As shown in FIGS. 1, 6-9, 23 and 24, due to the configuration of the first curved track 22 and the second curved track 24, the work-holding member 26 may be slidably moved with respect to the top surface 14 of the housing 12. The protrusion 36 near the second end 34 guides the second end of the work-holding member 26 within the second curved track 24. The protrusion(s) near the first end 32, guide the first end of the work-holding member 26 within the first curved track 22. In this manner, the work-holding member 26 may be moved between 45° and -45° with respect to the elongated opening 20. In order to assure a selected angular disposition of the work-holding member 26, an index 27 is placed on the base 28 of the work-holding member 26 and scalar indices 29 are marked on the top surface 14 of the housing 12 such that the index 27 on the base 26 of the work-holding member 26 may be juxtapositioned to the selected angle for cutting the workpiece W as will be described. When so aligned, the first end 32 of the work-holding means 26 is disposed at a corresponding angle with the elongated opening 20.

On the underside of the top surface 14 (FIG. 10), within the enclosure 18, are a plurality of spaced-apart support means 38. The support means 38 are under, and approximately parallel with, the elongated opening 20. Preferably, the support means 38 are three rails each having a length greater than the length of the elongated opening 20. As shown in FIGS. 11-14, the opposite ends of each rail is mounted on a respective plate 40. Each plate 40 is pivotally connected to the housing 12.

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A cutting means 48 is connected to the motor 44 such that powering of the motor drives the cutting means 48. The cutting means 48 is disposed in the elongated opening 20 in the top surface 14 of the housing 12 and projects upwardly above the horizontal plane of the top surface 14. Thus, any workpiece W held in the workpiece holder 26 and extending over the elongated opening 20 may be contacted by the cutting means 48. The cutting means 48 may be a cutting drill bit, a circular saw blade or any other cutting means known to persons skilled in the art. A cutting drill bit sold by Sears under the name "Saber-cut Zip Bits®" has been found to be useful.

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The end 46a of the rod 46 extending outwardly from the housing 12 serves as a handle. The rod 46 passes through an arcuate slot 42 formed in one of the side walls 16 of the housing 12. As the rod 46 is moved angularly with respect to a vertical plane through the elongated opening 20, the plates 40, the support means 38, the motor 44 and the cutting means 48 are all moved through the same selected angle. It is preferred that a scale 49 ranging from -45° through 0° to +45° be formed on the one of the side walls 16 immediately adjacent to the arcuate slot 42. This provides a simple and accurate means to select an angle for bevel cutting the workpiece W. It is also preferred that an electrical switch (not shown) be mounted on the handle 46a of the rod 46 which is exterior to the housing 12. The electrical switch is electrically connected to the electric motor 44 and the motor 44 can be readily energized when positioned as desired.

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As shown in FIGS. 1, 20-22, a protector 50 is disposed on the top surface 14 of the housing over the elongated opening 20. Preferably, the protector 50 has a frame having two end pieces 52 and at least two shafts 54 therebetween. It is preferred that three shafts 54 be disposed between the end pieces 52. A cover 56 having at least a transparent portion is disposed over the frame. The transparent portion is at the top of the frame so that the cutting operation can be viewed by the operator. The protector also serves to prevent accidental contact with the cutting means 48. The protector may be removable and also may be pivotally mounted along one side so the protector 50 may be pivoted (or flipped) to permit access to the cutting means 48. In this situation, the protector 50 is interlocked to prevent operation of the cutting means 48 when the protector 50 is not in place over the elongated opening 20. The cover 56 extends downwardly over the frame as a curtain to direct debris and sawdust from the cutting operation downwardly through the elongated opening 20 and away from the operator. It is preferred that the downward extending curtain portion of the cover 56 be formed with a plurality of vertical slits 57 to form fingers. The workpiece W may be easily received under the fingers of the cover 56 and the fingers are effective in directing the debris and sawdust.

A source of vacuum is optional and may be connected to the housing 12 to remove the debris and sawdust from the housing (FIG. 23). The source of vacuum may be connected to the housing 12 by a flexible hose 58 inserted into a fitting or opening in the housing 12. Preferably the flexible hose 58 is connected in the vicinity of the elongated opening 20 to more efficiently remove the debris and sawdust.

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In use, an operator places the workpiece W in the work-holding member 26 with a portion of the workpiece W being disposed under the protector 50 and over the elongated opening 20. The work-holding member 26 is disposed at an angle to provide the selected angle at which the miter cut is desired. The angle can be set between -45° and +45° as indicated on the scale 29. Miter cuts between 45° and 90° can be made by turning over the workpiece W. For example, turning the workpiece W over and cutting in the opposite direction at 30° can produce a miter cut of 60°. The first end of the work-holding member 26 is aligned with the cut line through the elongated opening 20. The work-holding member 26 is locked in the selected angle by pins, screws, clamps, detent means or other means known to persons skilled in the art.

The handle 46a of the rod 46 to control the angular disposition of the motor 44 and cutting means 48 is moved to the selected angle. The handle is locked at the selected angle by pins, screws, clamps, detent means or other means 60 known to persons skilled in the art.

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The motor 44 is energized by turning on an electrical switch which preferably is mounted on the handle 46a to the rod 46. The switch may be a "trigger" switch. The switch is interlocked with the protector 50 and the motor 44 cannot be energized unless the protector 50 is disposed over the cutting means 46. The source of vacuum, if present, is activated. The operator firmly holds the workpiece W in the work-holding member 26, pressing the workpiece W against one of the side walls 30 of the work-holding member 26. The operator manually moves the handle 46a of the rod 46 by either pushing the handle or pulling the handle so the cutting means 48 engages and cuts the workpiece W at the selected angle. An alternate embodiment (not shown) has a drive motor connected to the rod 46 to provide for powered longitudinal movement of the rod 46, the motor 44 and the cutting means 48. A separate electrical switch connected to the drive motor is mounted on the miter box 10.

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The miter box of the present invention is an extremely versatile, precision device. The support means 38 for the motor 44 allows the cutting means 48 to be drawn through the workpiece W in a straight, unwavering, and precise manner, ensuring the mitered crosscut to be made at the exact desired location. The swivel design of the cutting means 38, the motor 44 and the motor support means 38 with the plates 40 provides a virtual axis to precisely set the bias of the mitered cut from +45° to -45° relative to the referenced cut line on the workpiece W being cut. The sliding movement of the work-holding member 26 on the top surface 14 of the housing 12 provides two virtual axes to precisely set the angle of the cut of the workpiece from +45° to -45° relative to either edge of the workpiece W. The virtual axis of the bias cut and the virtual axes of the angle cuts are independent of each other thereby allowing precise composite molding miter cuts over the entire adjustable ranges of the bias and angle cuts. The control configuration allows dynamic adjustment of the bias and angle cuts during the cutting process to produce complicated miter cut designs. Thus, as shown in FIG. 28, a bias cut on a single end of a workpiece can be made with a portion cut at 45° and an adjoining portion cut at an angle of -45° (or any combination of angles between +45° and -45°).

IN THE CLAIMS

Please cancel claims 6-13 and 15 as being drawn to a non-elected invention and reserving the right to file a divisional or other application to preserve the novelty of the invention.

Please amend claims 1, 2, 3 and 14 as follows:

1. A miter box comprising:

a housing having a top surface and a plurality of supporting side walls forming an enclosure,

an elongated opening being formed in the top surface of the housing near a first of the supporting side walls,

a work-holding member having a first end, the work-holding member being connected to the top surface of the housing such that the work-holding member may be slidably moved with respect to the top surface of the housing to dispose the first end of the work holding member at a selected angle with respect to the elongated opening in the top surface of the housing,

a plurality of spaced-apart support means disposed in the enclosure under, and approximately parallel to, the elongated opening in the top surface of the housing,

an electrically-powered motor supported on the support means in the enclosure,

a cutting means driven by the electrically-powered motor, the cutting means projecting upwardly into the elongated opening in the top surface of the housing, and

means to move the electrically-powered motor with the cutting means longitudinally within the elongated opening, whereby a workpiece disposed in the work-holding member and

extending over the elongated opening will be cut at a predetermined angle corresponding to the selected angle of the work-holding member with respect to the elongated opening.

2. The miter box of claim 1, wherein the means to move the electrically-powered motor is a rod connected to the electrically-powered motor, the rod extending out of the housing, wherein movement of the rod produces longitudinal movement of the electrically-powered motor such that the cutting means is moved longitudinally with respect to the workpiece.

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3. The miter box of claim 1, wherein said means to move the electrically-powered motor with the cutting means moves the cutting means at a selected angle with respect to a vertical plane through the elongated opening in the top surface, whereby the workpiece extending over the elongated opening will be cut at a predetermined angle corresponding to the selected angle of the cutting means.

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14. In a power-driven saw machine for making a miter cut, a bevel cut, or a compound miter-bevel cut in a workpiece, wherein the machine includes a housing, a motor within the housing, and a cutting means driven by the motor and projecting above the housing; the improvement comprising a support means within the housing for supporting the motor for movement within the housing, the motor being pivotably disposed with respect to a vertical plane through the housing and being arranged at a desired angular relationship relative to the vertical plane whenever a bevel cut of the workpiece is intended, and a rod connected to the motor and having an end portion projecting externally of the housing, such that the end portion of the rod may be manually manipulated for moving the motor along the support means within the housing for making a cut in the workpiece,

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A10 whereby the workpiece will be supported on top of the housing and will be arranged at an angular relationship relative to the cutting means whenever a miter cut of the workpiece is intended.